FIELD CORN AND SILAGE CORN FOR SILAGE

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BULLETIN
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FIELD CORN AND SILAGE CORN FOR SILAGE

C. C. HAYDEN AND A. E. PERKINS

In Ohio, large, late varieties of "Silage corn" are extensively grown for silage. For several years the Department of Agronomy has conducted tests to determine the yields of some of these varieties compared with yields of the varieties commonly grown for grain. The results of these tests are reported in Bul. 269. Herein are reported the results of five later tests, comparing the yields and feeding value of the two types*.

The two varieties selected to represent these types were the Clarage, a grain variety, and the Blue Ridge, a silage variety. While reports of numerous experiments to determine the relative yields were available at the time this work was started, we were unable to find any reports of work to determine their relative digestibility or feeding value. About three years later, White and others of the Connecticut (Storrs) Station conducted an experiment and reported the results in "The Journal of Dairy Science."†

OBJECT OF THESE TESTS

Many dairymen have written to the Station inquiring about the comparative merits of the two kinds of corn, whether the increased yield of the large, late varieties compensated for the lower digestibility due to their coarseness and higher content of crude fiber. We were compelled to answer these questions without very definite data. It is a well known fact that the corn grain is more digestible than the stalks and that crude fiber is less digestible than other parts of plants. Reasoning from these facts, it generally has been assumed that per ton there is a considerable difference in the

*These tests were conducted by the Departments of Agronomy and Dairy Husbandry, cooperating.
†Journal of Dairy Science, July, 1922.

availability to animals, in favor of the variety of corn carrying a higher percentage of grain and a lower percentage of fiber. It was for the purpose of determining more accurately the comparative merits of the two kinds of silage for milk production that this series of feeding tests was undertaken.

PLAN OF THE EXPERIMENTS

The corn.—The work was started in the fall of 1916, and five successive tests were conducted during the five succeeding years. The corn used in these tests was grown and the yields determined by the Department of Agronomy. The two varieties, Clarage and Blue Ridge, were grown in the same fields in alternate strips of 12 rows each and otherwise treated alike, except that the Clarage, maturing earlier, was harvested considerably earlier than the Blue Ridge. There should be no difference in yield or feeding value due to soil differences or methods of cultivation. Samples of the corn as cut into the silo were taken, and analyzed. In order to determine the comparative amounts of green ears produced by the two varieties, one bundle, taken from each load as the corn came to the silo, was husked and the ears and stalks weighed separately.

TABLE I.—DATES OF HARVESTING, PERCENT OF DRY MATTER, AND YIELDS PER ACRE

Variety	1916	1917	1918	1919	1920	Average
Dates of harvesting						
Clarage	Sept. 11	Sept. 13	Sept. 6	Sept. 8	Sept. 22	Sept. 12
Blue Ridge	Sept. 20	Oct. 8	Oct. 3	Oct. 6	Oct. 8	Oct. 3
Days difference	9	25	27	28	16	21
Percent of dry matter in corn as harvested						
Clarage	31.31	27.02	34.97	33.64	27.12	30.81
Blue Ridge	28.76	27.68	28.15	30.93	28.91	28.88
Difference	2.55	—0.66	6.82	2.71	—1.79	1.93
Yield per acre as harvested—tons						
Clarage	7.85	12.23	10.24	11.59	9.66	10.31
Blue Ridge	8.78	13.97	12.36	14.06	10.67	11.97
Difference	0.93	1.74	2.12	2.47	1.01	1.66
Yields calculated on a 30 percent dry matter basis—tons						
Clarage	8.19	11.01	11.93	13.00	8.73	10.57
Blue Ridge	8.41	12.89	11.60	14.50	10.28	11.53
Difference	0.22	1.88	—0.33	1.50	1.55	0.96

In all tests, except the first, a sample of the green ears was taken, kiln-dried and shelled to determine the percent of dry grain in the dry matter of the entire plant. There was considerable variation in water content between the two varieties and within each variety from year to year. Therefore, in calculating results the yields of corn and the silage were reduced to a 30 percent dry matter basis to render them more readily comparable. The yields per acre as harvested and the yields calculated to the 30 percent basis are shown in Table I.

There was an average of 21 days difference in the time of cutting the two varieties of corn. The average dry matter content differed only 1.93 percent, and the average difference in yields per acre was 1.66 tons, or about 0.96 ton, when reduced to the 30 percent basis. The greatest difference in yield on the 30 percent dry matter basis was 1.88 tons in favor of the Blue Ridge. The Clarage out-yielded the Blue Ridge by 0.33 ton in 1918. These figures illustrate the fact that it is difficult for the farmer to estimate closely the relative yields, because he has no method of determining either the dry matter or the moisture. The differences in yields are not as great as have been secured at this Station in other tests on small plots; but, since the varieties were grown under like conditions for a period of five years, the results should represent what may be expected in sections where the late varieties will not mature.

TABLE II.—COMPARATIVE YIELDS OF GREEN EARS AND OF DRY GRAIN

Variety	1916	1917	1918	1919	1920	Average
Percent of green ears in the corn						
Clarage	26.32	35.51	45.45	45.60	36.36	37.85
Blue Ridge	14.00	27.10	40.06	43.29	34.24	31.74
Difference	12.32	8.41	5.39	2.31	2.12	6.11
Percent kiln-dried grain in total dry matter						
Clarage	....	30.38	41.39	46.64	44.16	40.64
Blue Ridge	....	19.18	20.22	39.21	22.48	25.27
Difference	.....	11.20	21.17	7.43	21.68	15.37

Table II shows that there was considerable variation in the amounts of ears produced in the five seasons and that the Clarage averaged only 6.11 percent more green ears than the Blue Ridge. It also shows that the difference between the kiln-dried grain of the

two varieties was 15.37 percent of the total dry matter of the plant in favor of the Clarage corn. The Clarage carried 92 pounds per ton, or 60.8 percent, more kiln-dried grain than the Blue Ridge (exclusive of test one, in which this data was not collected). If, as is commonly assumed, the grain is much more valuable per unit for feeding purposes than the other parts of the plant, one would expect a considerable difference in favor of the Clarage, on the ton basis.

The chemical analyses of the corn are shown in Table III.

TABLE III.—CHEMICAL ANALYSES OF DRY MATTER OF CORN AS HARVESTED

Variety	1916	1917	1918	1919	1920	Average
Percent protein						
Clarage	6.88	9.81	8.38	8.87	6.65	8.12
Blue Ridge	6.37	7.63	8.10	7.63	5.98	7.14
Difference	0.51	2.18	0.28	1.24	0.67	0.98
Percent nitrogen-free extract (starches, sugars, etc.)						
Clarage	64.35	61.51	64.13	64 87	64.40	63.85
Blue Ridge	58.76	62.01	59.68	61.25	61.62	60.66
Difference	5.59	—0.50	4.45	3.62	2.78	3.19
Percent crude fiber						
Clarage	21.10	21.50	19.01	18.18	21.74	20.30
Blue Ridge	27.12	23.36	23.58	23.57	24.33	24.39
Difference	—6.02	—1.86	—4.57	—5.39	—2.59	—4.09
Percent ether extract (fats, etc.)						
Clarage	3.18	2.37	3.60	3.63	2.15	2.98
Blue Ridge	2.52	2.45	3.29	2.95	2.24	2.69
Difference	0.66	—0.08	0.31	0.68	—0.09	0.29
Percent ash						
Clarage	4.29	4.85	4.88	4.45	5.06	4.70
Blue Ridge	5.23	4.55	5.35	4.60	5.84	5.11
Difference	—0.94	0.30	—0.47	—0.15	—0.78	—0.41

A study of the dry matter (Table III) shows that there were not very large differences in the nutrients of the two kinds of corn. The averages for the five tests show that the Clarage contained 0.98 percent more protein, 3.19 percent more nitrogen-free extract, and 0.29 percent more ether extract (fat, etc.) than the Blue Ridge;

and that the Blue Ridge contained 4.09 percent more crude fiber and 0.41 percent more ash than the Clarage. The most important difference, perhaps, is in crude fiber. With these small differences, could one well expect a very great difference in feeding value?

Since there was a difference of 15.37 percent in dry grain and of only 3.19 percent in the nitrogen-free extract, it is evident that the Blue Ridge, which was less mature, contained more sugar which had not yet been transferred to the ear and converted into starch, and that it was fully as digestible in the stalks as it would have been in the ear. This explanation seems to be supported to some extent by the results of the feeding tests.

TABLE IV.—PERCENTAGE AND CHEMICAL ANALYSES OF DRY MATTER OF SILAGE

Variety	1916	1917	1918	1919	1920	Average
			Percent of dry matter			
Clarage	29.91	26.06	36.04	32.20	27.81	30.40
Blue Ridge	26.07	25.48	28.57	28.83	25.26	26.84
Difference	3.84	0.58	7.47	3.37	2.55	3.56
			Percent of protein			
Clarage	7.58	9.79	8.62	8.62	7.01	8.32
Blue Ridge	7.04	8.46	8.19	7.89	6.19	7.55
Difference	0.54	1.33	0.43	0.73	0.82	0.77
			Percent of nitrogen free extract			
Clarage	61.86	56.41	62.72	60.24	59.99	60.24
Blue Ridge	58.29	57.11	59.79	60.63	58.27	58.82
Difference	3.57	—0.70	2.93	—0.39	1.72	1.42
			Percent of crude fiber			
Clarage	22.52	24.42	18.91	21.35	23.41	22.12
Blue Ridge	26.87	25.53	22.00	21.55	26.67	24.52
Difference	—4.35	—1.11	—3.09	—0.20	—3.26	—2.40
			Percent of fat			
Clarage	3.40	4.13	4.79	4.75	4.47	4.31
Blue Ridge	2.69	3.80	4.36	5.16	3.71	3.94
Difference	0.71	0.33	0.43	—0.41	0.76	0.37
			Percent of ash			
Clarage	4.65	5.24	4.95	4 68	5.11	4.92
Blue Ridge	4.77	5.09	5.66	4.74	5.15	5.08
Difference	—0.12	0.15	—0.71	—0.06	—0.04	—0.16

The silage.—One of the two stave silos in the dairy barn was filled with Clarage and the other with Blue Ridge silage each year. In all cases the silage was of excellent quality, and it was fed from both silos simultaneously. Three samples from each silo were taken at intervals during each season and analyzed. The averages of these analyses are shown in Table IV.

A study of the dry matter of the silages (Table IV) shows the differences in the nutrients of the two varieties. The average for the five tests shows that the Clarage silage contained 0.77 percent more protein, 1.42 percent more nitrogen-free extract, and 0.37 percent more fat than the Blue Ridge silage, and that the Blue Ridge silage contained 2.40 percent more fiber and 0.16 percent more ash than the Clarage.

Tables I and IV show that the average percent of dry matter in the Clarage corn as put into the silo was 30.81, and in the Clarage silage as fed, 30.40. The dry matter in the Blue Ridge corn as put into the silo was 28.88, and in the Blue Ridge silage as fed, 26.84 percent. The lower dry matter content in the silage was due to the addition of water to the silage as the silos were being filled. This difference was greater in the Blue Ridge, because the silage was cut later and at times frosted slightly, which gave it a dry appearance, causing more water to be added than was really necessary. These tables also show a slightly higher percentage of protein and fiber and a greater increase in percentage of fats in the dry matter of the silage than in the dry matter of the corn, and a decrease in the carbohydrates. This loss of carbohydrates from the silo was probably due to fermentation, with loss of gasses, and to the changing of sugar to acid. No greater loss from one variety than from the other is indicated. There was a small loss due to spoiled silage at the top, but none from leakage.

Possibly it was unfortunate that a greater effort was not made to feed equal amounts of dry matter in the two kinds of silage. It was fed by weight regardless of water content. However, one object of the test was to see how much of each variety the cows would consume. In some cases the cows did not relish the Blue Ridge silage quite as much as the Clarage silage.

The animals.—The cows used in this project were selected from the Station herd consisting of about 45 head of Jerseys and Holstein-Friesians. Their history since birth was available. From eight to twelve cows were used in each test. Usually larger numbers were entered but for various reasons it became necessary to

discard some of them. The lots contained both Jerseys and Holsteins in as nearly equal numbers as possible. Some of the cows were in the beginning of their lactation periods while others were more advanced and were not milking so well. They were without doubt producing as well as the average dairy herd, and the results should represent fairly what may be expected in ordinary feeding.

Data concerning the cows used in the tests are given in Tables XI and XII.

The cows were treated according to the regular winter routine. They received exercise each day in the open yard and were fed and watered twice daily. All feeds were weighed to them. Live weights were taken weekly during some of the tests and at longer intervals in others. In all cases the weighing was done in the forenoon after feeding and before watering. The milk at each milking was weighed and recorded and composite samples were tested for butterfat content four times each month.

In each test the double reversal system was used. The cows were divided into two lots of four to six animals each, as nearly equal as possible, all necessary characteristics considered. Both lots were fed the same basal ration. While one lot was being fed the Blue Ridge silage the other lot was being fed the Clarage silage. This was continued to about the middle of each test period, at which time the silages in the rations were reversed and continued to the end.

Each feeding period covered eight weeks or more. Six, seven, and eight week periods were selected for comparison, discarding two or more weeks of preliminary feeding. Two and three weeks were also discarded subsequent to the time the silages were reversed.

The basal ration.—The feeds used as a basal ration were mostly high in protein and such as are generally available. It was assumed that any difference in the value of the two varieties would be in their energy producing qualities, or carbohydrate and fat content. Therefore, the rations were planned to supply an abundance of protein and a shortage of carbohydrates, exclusive of that found in the silage.

Clover hay was used in the first test, alfalfa hay and a little soybean straw and corn stover in the second test, and alfalfa hay in the other three tests. The grains consisted of wheat bran, linseed oilmeal, cottonseed meal, ground oats, and ground corn. An attempt was made to keep the grain mixture, hay, and silage in definite proportions throughout each test, except test four, in which

the amounts of grain and hay were fixed. These proportions and the grain mixtures are given in the discussion of the various tests. A fair variety of feeds was used. The aim was to have the composition of the ration quite similar to that found in the ordinary balanced dairy ration. A more severe test made with high producing cows in the flush of their lactation periods might have shown a greater difference, but many of these cows were capable of high production, as indicated by the records presented in Table XII. It is recognized that, in any test of silages which might be made, it is not possible to get an exact measure of their relative values, because silage can not properly nor profitably be fed alone and because it may give a somewhat different value with each different basal ration. Other feeds, either alone or in combinations, might influence the digestibility. Since all cows were fed from the same lots of hay and from the same grain mixture, it was not considered necessary to analyze these feeds.

RESULTS

In computing the results, all silage was reduced to the same dry-matter basis—30 percent. This was about the average for the Clarage. In each test the results are presented on the basis of a unit (ton) of silage fed and on the acre basis. They are also presented without and by taking into account the gains in live weight of the animals. No particular effort was made to prevent the cows from gaining in live weight, as we believe that cows should gain in weight, especially after they have been bred; and this was intended to be a practical experiment to determine what might be expected under practical farm conditions. When taking into account the gains, it was considered that one pound of gain required as much nutrients as the production of 12.1 pounds of 4 percent milk*. This factor was used in estimating the amount of milk that would be equivalent to gains in live weight. When studying these results, the reader must keep in mind the fact that, *where a given amount of product is mentioned in connection with a given amount of silage, the product is from the ration carrying that silage and not from the silage alone.*

TEST ONE

In this test, in which 12 cows were used (Table XI), the feeding period extended from November 1, 1916 to April 3, 1917; and the change of rations was made January 31. The rations consisted

*These figures were obtained from data in "Feeds and Feeding," Abridged Edit, (1917) page 247; Ind Agr. Exp. Sta. Bul. 146; and from Armsby's "Nutrition of Farm Animals" (1917) page 512.

of grain, clover hay, and silage in the ratio of one to one to five, by weight. The grain mixture consisted of equal parts of bran, cottonseed meal, and linseed oilmeal. The cows were allowed what they would clean up readily in these proportions. From 34 to 50 pounds of silage was consumed daily. The last six weeks of the first thirteen-week feeding period were taken as representative of this period. After the change of rations, two weeks records were discarded and the following six weeks taken as representative of the second feeding period.

The feeds consumed by the 12 cows and the products from them follow:

	Silage Pounds	Hay Pounds	Grain Pounds	Milk Pounds	Fat Pounds
Clarage ration	19,862	3,919	3,938	12,154.4	479.9
Blue Ridge ration	17,622	3,970	3,986	11,600.9	456.3

On the ton basis.—After correcting for the relatively larger amount of grain and hay fed with the Blue Ridge, because that silage carried more moisture, the production for each ton of silage stands: Clarage ration, 1,223.9 pounds milk and 48.32 pounds butterfat; Blue Ridge ration, 1,227.2 pounds milk and 48.26 pounds fat, a difference of 3.3 pounds of milk and 0.06 pound of fat. This shows the relative efficiency for milk production alone to be, Clarage ration 100 to Blue Ridge ration 100.27; and for fat production, Clarage ration 100.12 to Blue Ridge ration 100, a difference of less than one percent—an amount well within the limits of error.

Taking into account the gains in live weight (page 276) and assuming one pound of gain equal to 12.1 pounds of milk, the production would stand; Clarage ration 1,462.6 and Blue Ridge ration 1,357.1 pounds of milk per ton of silage, a difference of 105.5 pounds of milk. This shows a relative efficiency of Blue Ridge ration 100 to Clarage ration 107.7, or a difference of 7.7 percent in favor of the Clarage ration.

On the acre basis.—The acre yields (30 percent dry matter) were 8.19 tons of Clarage and 8.41 tons of Blue Ridge. The products per acre of silage fed were 10,023.4 pounds of milk and 395.7 pounds of fat for the Clarage, 10,181.3 pounds of milk and 400.4 pounds of fat for the Blue Ridge, a difference of 157.9 pounds of milk and 4.7 pounds of fat. The relative efficiency per acre was Clarage ration 100 to Blue Ridge ration 101.57, a difference of 1.57 percent in favor of the Blue Ridge.

This corrected for difference in gain in live weight, shows the equivalent of 11,979.2 pounds of milk per acre of Clarage, and

11,273.4 pounds of milk per acre of Blue Ridge, a difference of 705.8 pounds of milk. The relative efficiency was Blue Ridge ration 100 to Clarage ration 106.26, or 6.26 percent in favor of the Clarage.

TEST TWO

Twelve cows were used in the second test, two lots of six each (Table XI). Like those in the first test, they varied considerably in milk flow. The feeding periods extended from November 15, 1917 to April 30, 1918, and the change of rations was made January 31.

In this test the rations consisted of clover hay, stover, soybean straw, grain, and silage in the ratio of one part hay and stover, one part grain, and five parts silage, by weight. The grain mixture consisted of equal parts of wheat bran, linseed oilmeal, cottonseed meal, and oats. The cows consumed from 34 to 42 pounds of silage each daily. They were allowed what they would clean up well.

For comparison, the last seven weeks of the first feeding period and seven weeks following the first three weeks of the second period, were selected. The feeds consumed by the cows and the production were as follows:

	Silage Pounds	Hay Pounds	Stover Pounds	Grain Pounds	Milk Pounds	Fat Pounds
Clarage ration	18,940	2,481	1,532	4,362	14,489 2	576 2
Blue Ridge ration	18,636	2,390	1,389	4,390	14,307 4	564 9

On the ton basis.—Corrected for the difference in grain and hay fed per unit of silage, as explained in test one, the results stand: Clarage ration 1,530 pounds milk and 60.96 pounds of fat per ton; Blue Ridge ration 1,537 pounds milk and 60.56 pounds fat per ton, a difference of 7 pounds of milk and 0.4 pound fat. This shows the relative efficiency on the ton basis to be for milk production, Clarage ration 100 to Blue Ridge ration 100.45; and for fat production, Clarage ration 100.46 to Blue Ridge ration 100, differences of less than one percent.

Taking into consideration gains in live weight, the production would stand: Clarage ration 1,871.9 pounds of milk and Blue Ridge ration 1,498.9 pounds of milk per ton of silage, a difference of 373 pounds. Therefore, the relative efficiency, including gains in weight, is Clarage ration 124.8 to Blue Ridge ration 100, a difference of 24.8 percent in favor of the Clarage.

On the acre basis.—The acre yield of Clarage was 11.01 tons and of Blue Ridge 12.89 tons. The products for one acre of Clarage silage fed were 16,850.9 pounds of milk and 671.46 pounds fat; and for Blue Ridge silage 18,252.5 pounds milk and 730.18 pounds

fat, a difference of 1,401.6 pounds milk and 58.72 pounds of fat. This shows a relative efficiency in milk production of 100 for the Clarage ration to 108.3 for the Blue Ridge ration; and in fat production, of 100 for the Clarage ration to 108.8 for Blue Ridge ration, a difference of a little over 8 percent in favor of the Blue Ridge.

When corrected for gains in live weight, the results show 20,616.7 pounds of milk for the Clarage ration, and 17,780.3 pounds for the Blue Ridge ration per acre of silage, a difference of 2,836.4 pounds of milk. The relative efficiency per acre of the two rations is Blue Ridge 100 to Clarage 115.9, or 15.9 percent in favor of Clarage.

TEST THREE

Ten cows, two lots of five each, completed the third test (Table XI).

The feeding periods extended from December 1, 1918 to April 30, 1919, and the change was made February 8. In this test the rations consisted of alfalfa hay, grain, and silage in the ratio of one to one to five. The grain mixture consisted of two parts linseed oil-meal, one part cottonseed meal, and two parts ground oats. The cows consumed from 30 to 42 pounds of silage each daily. For comparison, the last eight weeks of the first feeding period and the eight weeks following the first two weeks of the second period were used. The feeds consumed and the products were as follows:

	Silage Pounds	Hay Pounds	Grain Pounds	Milk Pounds	Fat Pounds
Clarage ration	22,686	3,978	3,983	14,528 4	612.64
Blue Ridge ration	18,940	3,967	3,977	13,640 8	591.43

On the ton basis.—Correcting for the relatively larger amount of grain and hay fed with the Blue Ridge silage, the results stand: Clarage ration 1,280.8 pounds of milk and 54.01 pounds of butterfat per ton; and Blue Ridge 1,315.2 pounds of milk and 56.94 pounds of fat per ton, a difference of 34.1 pounds of milk and 3.09 pounds of fat. This shows a relative efficiency per ton for the Clarage ration of 100 to Blue Ridge ration 102.68 for milk, and 100 to 105.7 for fat or differences of 2.68 and 5.7 percent in favor of the Blue Ridge.

Taking into consideration the gains in live weight, the production was 1,590.1 pounds of milk per ton of Clarage fed, and 1,372.7 pounds of milk per ton of Blue Ridge silage fed, a difference of 217.4 pounds. The relative efficiency for milk production was Clarage ration 115.8 to Blue Ridge ration 100, or a difference of 15.8 percent in favor of the Clarage ration.

On the acre basis.—The acre yields were 11.93 tons of Clarage and 11.60 tons of Blue Ridge. The milk per acre of Clarage fed was 15,281.0 pounds and the fat 644.4 pounds and the milk per acre of Blue Ridge was 15,469.3 pounds and the fat 671.5 pounds, a difference of 188.3 pounds milk and 27.1 pounds of fat. This shows a relative efficiency of Clarage ration 100 to Blue Ridge ration 101.2 in milk production and of 100 to 104.2 in fat production, differences of 1.2 and 4.2 percent in favor of the Blue Ridge ration. When corrected for gains in live weight, the production per acre stands: Clarage 18,971.7 pounds of milk and Blue Ridge 16,278.7 pounds, a difference of 2,693 pounds, including live weight gains, or a relative efficiency per acre of Blue Ridge ration 100 to Clarage 116.5, or 16.5 percent in favor of the Clarage ration.

TEST FOUR

Two lots of four cows each completed test four (Table XI). The feeding period extended from December 20, 1919, to April 30, 1920. The change in rations was made February 20. The rations consisted of alfalfa hay, grain, and silage. The hay was limited to 4 pounds to Jerseys and 6 to Holsteins daily; the grain to 6 pounds to Jerseys and 8 to Holsteins, and the silage was fed at will. The cows consumed from 36 to 60 pounds of silage each daily. The grain consisted of equal parts of bran, linseed oilmeal, and cottonseed meal. Three-fourths pound of bonemeal and one and one-fourth pounds of salt were added to each 100 pounds of grain. For comparison, the last six weeks of the first feeding period and the six weeks after the first three weeks of the second period were selected.

The feeds consumed and the products during this test were as follows:

	Silage Pounds	Hay Pounds	Grain Pounds	Milk Pounds	Fat Pounds
Clarage ration	17,639	1,596	2,268	7,258.9	337 44
Blue Ridge ration	15,148	1,596	2,260	6,717.1	318.71

On the ton basis.—Correcting for the relatively larger amount of grain and hay fed with each ton of Blue Ridge silage, the results are: Clarage ration 823.1 pounds of milk and 38.25 pounds of butterfat per ton; and Blue Ridge ration 836.06 pounds of milk and 39.56 pounds of fat per ton, a difference of 12.92 pounds of milk and 1.31 pounds of fat. The relative efficiency for milk production was 100 for the Clarage ration to 101.57 for the Blue Ridge, and for fat production, 100 to 103.4. These figures corrected for gains in live weight show the Clarage ration 1,156.5 pounds and Blue Ridge

1,058.1 pounds of milk per ton, a difference of 98.4 pounds and a relative efficiency for the Clarage ration of 109.3 to 100 for the Blue Ridge.

On the acre basis.—The yield per acre for the Clarage was 13 tons and for the Blue Ridge 14.5 tons. The milk per acre of Clarage fed was 10,699.6 and fat 497.38 and for Blue Ridge was 11,650.1 and 550.37 pounds, a difference of 950.5 pounds of milk and 53 pounds of fat. The relative efficiency per acre for milk was Clarage 100 to Blue Ridge 108.8, and for butterfat, Clarage 100 to Blue Ridge 110.6. Including gains in live weight reduced to a milk equivalent, the results are Clarage ration 15,033 pounds milk, and Blue Ridge ration 14,870 pounds milk, showing a relative efficiency per acre of 100 to 101.1, a difference of 1.1 percent in favor of the Clarage ration.

TEST FIVE

Twelve cows completed this test. They varied greatly in period of lactation and milk flow (Table XI). The feeding period extended from December 16, 1920 to April 30, 1921, and the change was made February 15. The rations consisted of alfalfa hay, grain, and silage in the ratio of 2.5 to 3 to 15. The grain mixture consisted of 1 part corn, 2 parts oats, 2 parts linseed oilmeal, 1 part cottonseed meal, and 1 part bran. The cows consumed daily 32 to 42 pounds of silage each. For comparison the last six weeks of the first period and the six weeks following the first two weeks of the second period were selected.

The feeds consumed and milk and butterfat produced were as follows:

	Silage Pounds	Hay Pounds	Grain Pounds	Milk Pounds	Fat Pounds
Clarage ration	16,798	3,584	3,034	10,022.4	439.90
Blue Ridge ration	14,770	3,512	2,944	9,465.9	417.66

On the ton basis.—Correcting for the relatively larger amount of grain and hay fed with the Blue Ridge silage, the results are, Clarage ration 1,193.3 pounds of milk and 52.37 pounds of fat, and for the Blue Ridge ration 1,214.1 pounds of milk and 53.54 pounds of fat, a difference of 20.8 pounds milk and 1.17 pounds of fat. The relative efficiency per ton for milk production was, Clarage ration 100 to Blue Ridge 101.74, and for fat, Clarage 100 to Blue Ridge 102.4, differences of 1.7 and 2.4 percent in favor of the Blue Ridge ration.

Correcting for gains in live weight, the results are Clarage ration 1,438 and Blue Ridge 1,363 pounds of milk per ton of silage, a difference of 75.3 pounds of milk, or a relative efficiency of 100 to 105.6, a difference of 5.6 percent in favor of the Clarage ration.

On the acre basis.—The yield of Clarage was 8.73 tons and of Blue Ridge 10.28 tons. The milk per acre from the Clarage ration was 10,417.3 pounds and the fat, 457.23 pounds; and that from the Blue Ridge ration 11,511.5 and 507.8 pounds, a difference of 1,094.2 pounds of milk and 50.57 pounds of fat, or a relative efficiency of 100 to 110.5 for milk and of 100 to 111 for fat, in favor of the Blue Ridge ration.

Correcting for gains in live weight Clarage ration was 12,491.8 and the Blue Ridge 13,029.5 pounds, a difference of 537.7 pounds. The relative efficiency of the two rations was 100 to 104.3, a difference of 4.3 percent in favor of the Blue Ridge ration per acre.

TABLE V.—PRODUCTS PER TON AND PER ACRE WITHOUT AND WITH CORRECTION FOR GAINS

Test	Milk			Fat		
	Clarage pounds	Blue Ridge pounds	Difference pounds	Clarage pounds	Blue Ridge pounds	Difference pounds
Per ton of silage fed						
1	1,223.9	1,227.2	3.3	48.32	48.26	—0.06
2	1,530.0	1,537.0	7.0	60.96	60.56	—0.40
3	1,280.8	1,315.2	34.4	54.01	57.10	3.09
4	823.1	836.0	12.9	38.25	39.56	1.31
5	1,193.3	1,214.1	20.8	52.37	53.54	1.17
Average	1,210.2	1,225.9	15.7	50.78	51.80	1.02
Per ton including gains						
1	1,462.6	1,357.1	105.5	.....	.....	.....
2	1,871.9	1,498.9	373.0	.....	.....	.....
3	1,590.1	1,372.7	217.4	.....	.....	.....
4	1,156.5	1,058.1	98.4	.....	.....	.....
5	1,438.3	1,363.0	75.3	.....	.....	.....
Average	1,503.9	1,330.0	173.9	.....	.....	.....
Per acre of silage fed						
1	10,023.4	10,181.3	157.9	395.70	400.40	4.70
2	16,850.9	18,252.5	1,401.6	671.46	730.18	58.72
3	15,281.0	15,469.3	188.3	644.40	671.50	27.10
4	10,699.6	11,650.1	950.5	497.38	550.37	53.00
5	10,417.3	11,511.5	1,094.2	457.23	507.80	50.57
Average	12,654.4	13,412.9	758.5	533.23	572.05	38.82
Per acre including gains						
1	11,979.2	11,273.4	705.8	.....	.....	.....
2	20,616.7	17,780.3	2,836.4	.....	.....	.....
3	18,871.7	16,278.7	2,593.0	.....	.....	.....
4	15,033.0	14,870.0	163.0	.....	.....	.....
5	12,491.8	13,029.5	—537.7	.....	.....	.....
Average	15,798.5	14,646.4	1,152.1	.....	.....	.....

In Table V the quantity of products per ton and per acre of silage fed with and without considering gains in live weight, are brought together for ready comparison and in Table VI are given the relative efficiencies of the rations.

TABLE VI.—RELATIVE EFFICIENCY OF CLARAGE AND BLUE RIDGE SILAGES

Test	Milk only		Fat only		Milk and gain	
	Clarage	Blue Ridge	Clarage	Blue Ridge	Clarage	Blue Ridge
On the ton basis						
1	100	100.27	100	99.88	107.77	100
2	100	100.45	100	99.53	124.80	100
3	100	102.68	100	105.70	115.80	100
4	100	101.57	100	103.40	109.30	100
5	100	101.74	100	102.40	105.60	100
Average	100	101.34	100	102.18	112.65	100
On the acre basis						
1	100	101.57	100	101.18	106.26	100
2	100	108.30	100	108.80	115.90	100
3	100	101.20	100	104.20	116.54	100
4	100	108.80	100	110.60	101.10	100
5	100	110.50	100	111.00	95.88	100
Average	100	106.07	100	107.16	107.13	100

A summary of the results from these five tests shows that, *ton* for *ton*, and for milk production only, the Blue Ridge rations led by an average of 1.34 percent, leading in all tests. Taking into consideration gains and losses in live weight, the advantage was reversed and the Clarage rations led by 12.65 percent.

On the acre basis and for milk production only, the Blue Ridge rations led in every case and by an average of 6.07 percent; but, including gains in live weight the Clarage rations led in every case except one and by an average of 7.13 percent.

For milk and fat production only, the Blue Ridge led on both the ton and acre basis. For milk and fat production plus correction for gains in live weight, the Clarage rations led on both the ton and acre bases.

The total of gains by all lots on the Clarage silage was 1,081.64 pounds and by all lots on Blue Ridge silage was 340.48 pounds, a ratio of three to one. This corresponds quite closely with the results obtained by White and others referred to on page 261. Their cows on silage made of early maturing corn gained 17.67 pounds each and those on the silage made of late maturing corn lost 14 pounds each. While this seems to show a tendency of the more

mature corn, carrying a high percent of grain, to cause the cows to gain in weight at the expense of milk production, it probably is due to an excess of nutrients above that required for milk production, as, in our tests, more total feed was consumed in the Clarage ration. It is also of interest to note that the early maturing corn was in both cases yellow corn and the late maturing corn was white corn.

TABLE VII.—TOTAL GAINS IN LIVE WEIGHT FOR CLARAGE AND BLUE RIDGE RATIONS, POUNDS

Test	Clarage	Blue Ridge
1	195.96	94.56
2	267.60	28.20 (loss)
3	290.00	45.00
4	243.00	139.00
5	85.08	90.12
Total	1,081.64	340.48

In our tests, the cows on rations containing silage from immature corn produced more milk per unit of silage than did the cows on rations containing silage from more mature corn. The Connecticut experiment referred to shows the same results. On the mature silage their cows produced 28.28 pounds of milk and on the immature silage 29.20 pounds of milk per day. Both projects have the same fault, that of feeding relatively more grain per unit of dry matter with the silage from late maturing corn. In our work we made a correction for this, as stated on page 269; but this correction may not have been sufficient. Table VIII shows the

TABLE VIII.—FEEDS CONSUMED AND MILK AND FAT PRODUCED

Test	Grain pounds	Hay and stover pounds	Silage pounds	Milk pounds	Fat pounds
Clarage periods					
1	3,938	3,919	19,861	12,154.4	479.93
2	4,361	2,481 1,532 (stover)	18,940	14,489.2	576.29
3	3,983	3,978	22,686	14,528.4	612.64
4	2,268	1,596	17,639	7,258.9	337.44
5	3,034	3,584	16,798	10,022.4	439.89
Total	17,585	17,089	95,924	58,453.3	2,446.19
Blue Ridge periods					
1	3,986	3,970	17,622	11,600.9	456.35
2	4,390	2,390 1,389 (stover)	18,636	14,307.4	564.89
3	3,977	3,967	18,940	13,640.8	591.43
4	2,260	1,596	15,148	6,717.1	318.71
5	2,944	3,512	14,770	9,465.9	417.67
Total	17,557	16,826	85,116	55,732.1	2,349.05

total products and feeds. It will be seen that larger quantities were fed in the Clarage ration. This accounts largely for the greater gains with this ration. However, in test two where the quantities were most nearly equal, we find the greatest difference in gains, the second highest gains on the Clarage ration, and the most milk per pound of nutrients.

TABLE IX.—DIGESTIBLE NUTRIENTS AND MILK PER POUND OF NUTRIENTS

Test	Clarage pounds	Blue Ridge pounds	Difference pounds	Milk per pound nutrients	
				Clarage pounds	Blue Ridge pounds
1	9,295.47	8,849.55	445.92	1.307	1.311
2	9,372.14	9,211.38	160.76	1.546	1.553
3	10,142.77	9,286.27	856.50	1.432	1.469
4	6,429.30	5,860.57	568.73	1.129	1.146
5	7,893.89	7,331.51	562.38	1.271	1.291
Average	8,526.71	8,107.85	518.86	1.337	1.354

Table IX shows the digestible nutrients consumed, the differences between the rations, and the amount of milk per pound of digestible nutrients consumed.

If our methods of calculating are correct, there is considerable difference per ton in favor of the Clarage corn. Where the difference in tonnage per acre is no greater than in these tests, this difference per ton in favor of the Clarage may overcome the difference in yield.

HIGH PRODUCING COWS

For further comparison two of the heavier producing cows were selected from each test, one from each lot. The results with these cows are shown in Table X.

TABLE X.—RELATIVE EFFICIENCY OF THE TWO VARIETIES OF SILAGE ON A TON BASIS, TWO HIGHEST COWS FROM EACH TEST

Test	Milk		Fat		Milk and gain	
	Clarage	Blue Ridge	Clarage	Blue Ridge	Clarage	Blue Ridge
1	100	95.6	100	93.8	149.0	100
2	100	96.9	100	94.2	112.8	100
3	100	110.2	100	120.8	99.7	100
4	100	96.5	100	99.0	142.8	100
5	100	111.4	100	108.3	163.0	100
Average	100	102.1	100	103.2	133.5	100

Table X shows that so far as milk and fat are concerned and on the silage unit basis, the average results are practically the same as when all cows were considered, although there is greater variation.

When gains in live weight are considered, the difference in favor of Clarage is greatly increased. The heavy producing cows appear to have gained more than the light producers. It is entirely possible that the factor (12.1) used in estimating the value of gain in live weight in terms of milk is too high. In the case of cows in calf a pound of gain in weight of fetus may not require as much energy as a pound of gain in flesh or fat. However, among these higher producers, the cows not in calf gained as much as those in calf.

We regret that we were unable to make digestion tests in this project.

CONCLUSIONS

The Clarage corn was cut an average of 21 days earlier than the Blue Ridge corn.

The Blue Ridge corn yielded more dry matter per acre in four of the five seasons, the Clarage leading in one season. The average difference was 0.96 ton of 30 percent dry matter silage per acre in favor of the Blue Ridge corn.

The difference in kiln-dried grain produced by the two varieties was 15.37 percent of the total dry matter of the plant in favor of the Clarage corn. This is equal to 60.8 percent more kiln-dried grain in the Clarage than in the Blue Ridge corn.

The dry matter of the Clarage corn carried 0.98 percent more protein, 3.19 percent more nitrogen-free extract and 0.29 percent more ether extract, while the dry matter of the Blue Ridge carried 4.09 percent more crude fiber and 0.41 percent more ash. These proportions were not materially changed in the silage.

There was a slight loss of carbohydrates in the process of silage formation but no greater loss from one variety than from the other.

The Clarage silage seemed a little more palatable than the Blue Ridge.

The results of the five successive tests show that in every case the Blue Ridge silage seemed to be more efficient for milk and butterfat production than the Clarage silage. However, per unit of silage, this difference was small (1.34 percent) and hinged on whether our correction for differences in grain fed was correct.

The actual difference per ton of silage fed was 15.7 pounds of milk and 1.02 pounds of butterfat in favor of the Blue Ridge ration. Where live weight gains were considered, the results were reversed and the Clarage ration led by 12.65 percent—an actual difference equivalent of 173.9 pounds of milk in favor of the Clarage corn.

On the acre basis for milk and fat only, the Blue Ridge led by 6.07 percent and 7.16 percent, respectively, the actual difference being 758.5 pounds of milk and 38.82 pounds of fat. Considering milk and live weight gains, on the acre basis, the Clarage ration led by 7.13 percent or 1,152 pounds of milk. (Too much weight should not be given to this last figure because of the uncertainty of the accuracy of the factor used in estimating pounds of milk equivalent to one pound of gain.)

Data from two of the highest producing cows from each test show practically the same average results, though there is wider variation than when all cows are considered.

While there appeared to be a stronger tendency on the part of the more mature Clarage silage to cause the cows to gain in weight, it is probable that the extra gains were due to the fact that the cows ate a little more of the Clarage ration, thus providing more nutrients than required for the amount of milk produced. However, it is interesting to note that the cows in our work and also in work at the Connecticut Station made greater gains on silage from yellow corn than from white corn.

The results from these five tests indicate that, all things considered, there is much less difference per acre between the ordinary field corn and the large ensilage corn than is commonly supposed.

Where the season is of sufficient length to permit the ripening of the large late-maturing corn the difference in yield might be considerably greater, and overcome the difference in quality. Appearance or tonnage at cutting time may be very deceiving, because of the larger size and the greater amount of water contained in the late-maturing corn.

APPENDIX

TABLE XI.—DATA CONCERNING COWS IN TESTS

Herd No.	Breed	Age years	Calved	Bred	Daily milk, pounds	Percent fat
			Test I, Lot 1			
68	Jersey	7	October 2, 1916	Not bred	22	4.4
96	Jersey	4	August 16, 1916	December 6, 1916	19	5.5
101	Jersey	4	September 9, 1916	December 22, 1916	19	5.1
92	H. F.	4	August 2, 1916	December 19, 1916	33	3.5
76	H. F.	6	October 11, 1916	December 20, 1916	32	3.2
132	H. F.	2	September 27, 1916	February 6, 1917	27	3.7
			Test I, Lot 2			
88	Jersey	5	October 27, 1916	Not bred	28	5.9
115	Jersey	3	August 1, 1916	November 28, 1916	17	5.7
97	Jersey	4	October 13, 1916	January 16, 1917	23	4.7
104	H. F.	4	September 3, 1916	December 21, 1916	33	3.7
109	H. F.	3	August 24, 1916	November 17, 1916	36	3.5
139	H. F.	2	September 27, 1916	February 1, 1917	29	3.6
			Test II, Lot 1			
71	H. F.	7	October 16, 1917	February 17, 1918	41	3.2
107	H. F.	4	August 25, 1917	December 30, 1917	40	3.5
124	H. F.	3	August 24, 1917	December 11, 1917	37	3.9
101	Jersey	5	October 3, 1917	December 31, 1917	26	4.9
128	Jersey	3	October 6, 1917	December 30, 1917	17	5.3
106	Jersey	4	December 2, 1917	February 28, 1918	25	5.0
			Test II, Lot 2			
92	H. F.	5	September 25, 1917	February 23, 1918	47	3.5
109	H. F.	4	August 24, 1917	January 9, 1918	36	3.4
104	H. F.	5	September 25, 1917	January 21, 1918	40	3.3
96	Jersey	5	September 13, 1917	February 10, 1918	16	5.2
112	Jersey	4	September 25, 1917	December 10, 1917	17	5.4
115	Jersey	4	September 2, 1917	December 15, 1917	18	5.4
			Test III, Lot 1			
128	Jersey	4	October 14, 1918	January 13, 1919	24	4.9
147	Jersey	3	September 21, 1918	January 13, 1919	19	4.9
127	Jersey	4	October 8, 1918	January 8, 1919	21	5.1
109	H. F.	5	October 19, 1918	Not bred	45	3.5
163	H. F.	2	October 29, 1918	February 25, 1919	28	4.0
70	H. F.	9	August 23, 1918	November 20, 1918	20	3.2
			Test III, Lot 2			
167	Jersey	2	October 7, 1918	March 11, 1919	17	4.3
112	Jersey	5	September 17, 1918	January 17, 1919	27	4.6
96	Jersey	6	November 4, 1918	April 19, 1919	30	5.5
57	H. F.	11	December 20, 1918		24	3.5
107	H. F.	6	August 12, 1918	March 22, 1919	29	3.4
124	H. F.	4	September 8, 1918	Not bred	35	3.8
			Test IV, Lot 1			
147	Jersey	4	September 27, 1919	February 22, 1920	20	5.0
127	Jersey	5	August 4, 1919	November 29, 1919	15	5.2
165	H. F.	3	October 21, 1919	March 11, 1920	29	3.8
121	H. F.	6	March, 23, 1919	September 5, 1919	26	3.5

TABLE XI.—DATA CONCERNING COWS IN TESTS—Continued

Herd No.	Breed	Age years	Calved	Bred	Daily milk, pounds	Percent fat
			Test IV, Lot 2			
128	Jersey	5	September 21, 1919	February 20, 1920	20	5.4
162	Jersey	3	June 6, 1919	March 30, 1920	14	5.8
196	Jersey	2	November 22, 1919	Not bred	21	5.0
90	H. F.	8	March 10, 1919	Not bred	33	3.8
			Test V, Lot 1			
110	H. F.	7	February 5, 1920	Not in calf	20	3.0
200	H. F.	3	June 10, 1920	Not in calf	24	3.5
161	H. F.	4	August 5, 1920	December 28, 1920	29	3.1
205	Jersey	2	June 6, 1920	October 18, 1920	13	5.4
112	Jersey	7	November 10, 1920	March 17, 1921	15	5.3
147	Jersey	5	October 13, 1920	Not in calf	19	5.0
			Test V, Lot 2			
203	H. F.	2	August 2, 1920	Not bred	24	3.0
121	H. F.	7	July 14, 1920	December 9, 1920	36	3.3
206	Jersey	2	July 15, 1920	March 10, 1921	15	5.7
173	Jersey	4	January 11, 1920	Not bred	10	6.7
128	Jersey	6	October 26, 1920	Not in calf	24	5.4
127	Jersey	6	September 8, 1920	December 30, 1920	19	5.1

TABLE XII.—THE HIGHEST RECORDS OF COWS USED IN THESE TESTS GIVEN TO SHOW THE REAL CAPACITY OF EACH COW

Herd No.	Milk	Fat	Days	Private and official records
68	6,304	300	365	Private
96	9,412	500	365	R. M.
101	5,277	276	309	Private
92	19,485	662	365	A. R. S. O.
76	9,572	307	339	Private
132	7,020	249	277	Private, 1st calf
88	6,379	333	341	Private
115	5,408	305	365	Private
97	4,306	201	347	Private, 1st calf
104	16,416	531	365	A. R. S. O.
109	15,001	520	365	A. R. S. O.
139	9,452	315	363	Private, 1st calf
106	8,710	465	365	R. M.
107	22,161	753	365	A. R. S. O.
71	3,763	208	348	Private, 1st calf
124	20,377	763	365	A. R. S. O.
128	6,305	360	365	Private, 1st calf
112	11,700	618	365	R. M.
147	6,845	362	366	Private
127	10,752	582	365	R. M.
163	15,017	626	365	A. R. S. O.
70	17,492	592	365	A. R. S. O.
167	4,955	256	335	Private
57	21,171	711	365	A. R. S. O.
165	9,529	404	365	Private
121	15,521	558	365	A. R. S. O.
162	10,325	564	365	R. M.
196	6,720	323	351	Private, 1st calf
90	17,135	642	365	Private
110	12,807	461	365	Private
200	10,039	356	365	Private. 1st calf
161	11,668	365	365	A. R. S. O.
205	5,471	296	?	Private, 2-yr. old
203	8,913	294	365	Private, 2-yr. old
206	5,906	346	365	Private, 2-yr. old
173	5,047	282	365	Private, 2-yr. old

TABLE XIII.—FEEDS CONSUMED AND PRODUCTS PER WEEK DURING TEST ONE, LOTS I AND II

Week	Grain pounds	Clover hay pounds	Silage pounds	Milk pounds	Fat pounds
Clarage periods					
1	673.4	673.4	3,367	2,099.6	83.04
2	672.5	672.6	3,363	2,128.5	84.26
3	660.6	660.6	3,303	2,062.5	80.44
4	651.0	632.3	3,255	1,971.7	75.84
5	639.2	639.2	3,196	1,902.4	77.62
6	641.4	641.4	3,207	1,989.7	78.68
Total	3,938.2	3,919.5	19,691	12,154.4	479.88
On 30 percent dry-matter basis			19,861		
Blue Ridge periods					
1	686.0	686.0	3,430	2,038.6	80.25
2	667.8	667.8	3,339	2,040.4	79.88
3	666.4	650.9	3,332	1,960.3	76.72
4	657.5	657.6	3,288	1,860.7	72.41
5	650.6	650.6	3,243	1,824.4	73.29
6	657.6	657.6	3,288	1,876.5	73.80
Total	3,986.0	3,970.5	19,920	11,600.9	456.35
On 30 percent dry-matter basis			17,622		

TABLE XIV.—FEEDS CONSUMED AND PRODUCTS PER WEEK DURING TEST TWO, LOTS I AND II

Week	Grain pounds	Hay pounds	Soybean silage and stover pounds	Silage pounds	Milk pounds	Fat pounds
Blue Ridge periods						
1	627.2	313.6	227.3	3,126	2,126.7	85.50
2	627.2	313.6	226.7	3,136	2,074.8	82.67
3	627.2	313.6	251.0	3,136	2,026.5	79.46
4	627.2	313.6	242.9	3,136	2,043.6	80.35
5	627.2	313.6	250.0	3,136	2,039.5	78.56
6	627.2	350.3	97.2	3,136	1,997.2	78.53
7	627.2	471.8	94.2	3,136	1,999.1	79.82
Total	4,390.4	2,390.1	1,389.3	21,942	14,307.4	564.89
30 percent dry-matter basis				18,636		
Clarage period						
1	621.6	305.8	247.4	3,108	2,177.2	87.53
2	621.6	310.8	248.1	3,108	2,084.0	84.70
3	621.6	310.8	261.5	3,108	2,109.9	82.89
4	621.6	310.8	274.5	3,108	2,117.5	82.72
5	621.6	310.8	251.9	3,108	2,072.0	80.35
6	626.4	462.6	125.5	3,128	2,021.1	78.83
7	627.2	469.0	123.1	3,136	1,967.5	79.27
Total	4,361.6	2,480.6	1,532.0	21,804	14,549.2	576.29
30 percent dry-matter basis				18,940		

TABLE XV.—FEEDS CONSUMED AND PRODUCTS PER WEEK DURING TEST THREE, LOTS I AND II

Week	Grain pounds	Alfalfa hay pounds	Silage pounds	Milk pounds	Fat pounds
Clarage periods					
1	490.8	488.3	2,479	1,804.0	75.91
2	498.4	498.4	2,492	1,846.2	77.72
3	498.4	495.9	2,478	1,798.3	76.15
4	498.4	498.4	2,487	1,849.5	76.85
5	498.4	498.4	2,485	1,835.1	76.72
6	498.4	498.4	2,486	1,817.4	77.20
7	498.8	498.8	2,489	1,780.1	75.95
8	501.2	501.2	2,506	1,797.8	76.14
Total	3,982.8	3,977.8	19,902	14,528.4	612.64
On 30 percent dry-matter basis			22,686		
Blue Ridge periods					
1	495.6	495.6	2,471	1,744.4	76.17
2	494.8	496.2	2,478	1,746.0	76.49
3	494.0	494.0	2,478	1,745.0	76.03
4	494.6	495.6	2,472	1,739.8	76.12
5	495.6	495.6	2,478	1,702.1	74.28
6	495.6	495.6	2,478	1,628.6	70.47
7	500.4	500.4	2,502	1,652.1	70.56
8	506.0	494.5	2,530	1,682.8	71.30
Total	3,976.6	3,967.5	19,888	13,640.8	591.43
On 30 percent dry-matter basis			18,940		

TABLE XVI.—FEEDS CONSUMED AND PRODUCTS PER WEEK DURING TEST FOUR, LOTS I AND II

Weeks	Grain pounds	Alfalfa Hay pounds	Silage pounds	Milk pounds	Fat pounds
Clarage periods					
1	378	266	2,788	1,213.5	56.86
2	378	266	2,874	1,218.3	56.39
3	378	266	2,742	1,202.0	55.13
4	378	266	2,718	1,208.4	56.21
5	378	266	2,701	1,209.4	56.67
6	378	266	2,691	1,207.3	56.14
Total	2,268	1,596	16,514	7,258.9	337.40
On 30 percent dry-matter basis			17,639		
Blue Ridge					
1	378	266	2,666	1,168.2	54.37
2	378	266	2,722	1,166.4	55.39
3	370	266	2,537	1,115.0	53.61
4	378	266	2,648	1,082.6	52.61
5	378	266	2,380	1,124.6	51.92
6	378	266	2,610	1,060.3	50.81
Total	2,260	1,596	15,563	6,717.1	318.71
On 30 percent dry-matter basis			15,148		

TABLE XVII.—FEEDS CONSUMED AND PRODUCTS PER WEEK DURING TEST FIVE, LOTS I AND II

Week	Grain pounds	Hay pounds	Silage pounds	Milk pounds	Fat pounds
Clarage periods					
1	504.4	603.8	3,016	1,689.9	72.52
2	506.1	606.9	3,037	1,708.2	73.95
3	506.5	603.3	3,005	1,721.8	75.59
4	506.1	592.4	3,037	1,640.7	72.27
5	506.1	595.5	3,028	1,654.6	73.32
6	505.1	581.7	2,978	1,607.2	72.24
Total	3,034.3	3,583.6	18,102	10,022.4	439 89
On 30 percent dry-matter basis			16,798		
Blue Ridge periods					
1	477.8	570.0	2,870	1,592.1	69.04
2	487.7	584.8	2,910	1,625.8	71.74
3	492.1	592.4	2,920	1,616.0	71.02
4	499.4	601.2	2,997	1,591.6	69.39
5	495.9	595.5	2,961	1,538.5	68.65
6	490.7	568.6	2,884	1,501.9	67.83
Total	2,943.6	3,512.2	17,542	9,465.9	417.67
On 30 percent dry-matter basis			14,770		

TABLE XVIII.—FACTORS* USED IN DETERMINING DIGESTIBLE NUTRIENTS IN SILAGE TESTS

			Digestible nutrients percent
Test 1			
	Bran (60.9), Oilmeal (77.9), Cottonseed meal (75.5)	Grain mixture	71.4
	Clover hay		50.9
	Silage		22.6
Test 2			
	Bran (60.9), Oilmeal (77.9), Cottonseed meal (75.5), Oats (70.4)	Grain mixture	71.2
	Alfalfa hay		51.6
	Stover		46.1
	Silage		22.6
Test 3			
	Oilmeal (77.9), Cottonseed meal (75.5), Oats (70.4)	Grain mixture	74.4
	Alfalfa hay		51.6
	Silage		22.6
Test 4			
	Bran (60.9), Oilmeal (77.9), Cottonseed meal (75.5)	Grain mixture	71.4
	Alfalfa hay		51.6
	Silage		22.6
Test 5			
	Corn (85.7), Oats (70.4), Oilmeal (77.9), Cottonseed meal (75.5), Bran (60.9)	Grain mixture	74.1
	Alfalfa hay		51.6
	Silage		22.6

*Feeds and Feeding, 16th Edition, Henry and Morrison.